

# *Cupaniopsis papillosa* P.I.Forst. (Sapindaceae), a new species from the 'Wet Tropics' of north-east Queensland

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## Summary

Forster, P.I. (2006). *Cupaniopsis papillosa* P.I.Forst. (Sapindaceae), a new species from the 'Wet Tropics' of north-east Queensland. *Austrobaileya* 7(2): 293–298. A new species from the 'Wet Tropics' rainforest, *Cupaniopsis papillosa* is described and illustrated. This species is restricted to upland rainforest (complex notophyll vineforest) on basalt-derived substrates near Ravenshoe. A revised key to the species of Australian *Cupaniopsis* is provided.

Key Words: Sapindaceae, *Cupaniopsis dallachyi*, *Cupaniopsis papillosa*, new species, Wet Tropics biodiversity, Australian flora, Queensland flora, identification key

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## Introduction

The genus *Cupaniopsis* Radlk. comprises at least 61 species and is distributed in Malesia (New Guinea, Celebes, Moluccas), various islands in the Western Pacific and Australia (Adema 1991). Fifteen described species have been recognised for Australia (Forster 2002), although Adema (1991) only recognised twelve more broadly defined ones in his monograph.

The new species *Cupaniopsis papillosa* is described in the current paper. Specimens of this species were first collected by Bruce Gray in 1978 near Ravenshoe and were referred to *C. dallachyi* S.T.Reynolds in the original description of that species (Reynolds 1985). Field observations and collections of fruiting plants near Ravenshoe led Wendy Cooper to realise that a second species was involved due to the highly distinctive fruit and seed of those plants when compared to plants of *C. dallachyi* near to the type locality at Jaggan near Malanda (Cooper & Cooper 2004).

## Material & methods

The data and description presented in this paper are based on holdings at BRI and QRS. The species description is modelled on that for *C. cooperorum* (Forster 2002), but with more detail given to venation description following the terminology of Hickey (1973) and Ash

*et al.* (1999). In their scheme the different components of venation are described using a numerical system with the recognition of a midrib (1° vein order), lateral veins (2° vein order) and intercostal veins (3° and onwards vein orders) within any leaf lamina. When an intercostal vein comprises a continuous raised line of cells it is termed 'distinct'; if it is discontinuous or fades away into the body of the lamina, it is termed 'indistinct'. Indumentum cover is described using the terminology of Hewson (1988), except that 'scattered' is used instead of 'isolated'. The shapes of leaves, sepals and petals are described using the terminology of Hickey & King (2000). Length and width dimensions are indicated as length measurement × width measurement followed by the measurement unit.

## Taxonomy

***Cupaniopsis papillosa* P.I.Forst., species nov.** a *C. dallachyi* foliolorum numero in eodem folio (5–6 (–7)-jugato non 2–4-jugato), intervallo secundario laterali minore venarum in parte media foliolorum (3–9 mm non 10–16 mm), fructus pagina minute papillosa (in illa glabra) et colore hinnuleo-flavo non fulvo, arilli colore (rubro non aurantiaco-flavo) et seminibus ellipsoideo-obovoideis (adversum semina planato-ellipsoidea) differt. **Typus:** Queensland. COOK DISTRICT: Gold Coast road, near Ravenshoe, 17°38'S, 145°31'E, 19 March

2004, *W.Cooper WWC1838* & *R.Jensen* (holo: BRI [3 sheets + spirit]; iso: A, L, MEL, MO, NSW, NE distribuendi).

*Cupaniopsis* sp. (Tully Falls) in Cooper & Cooper (2004: 484).

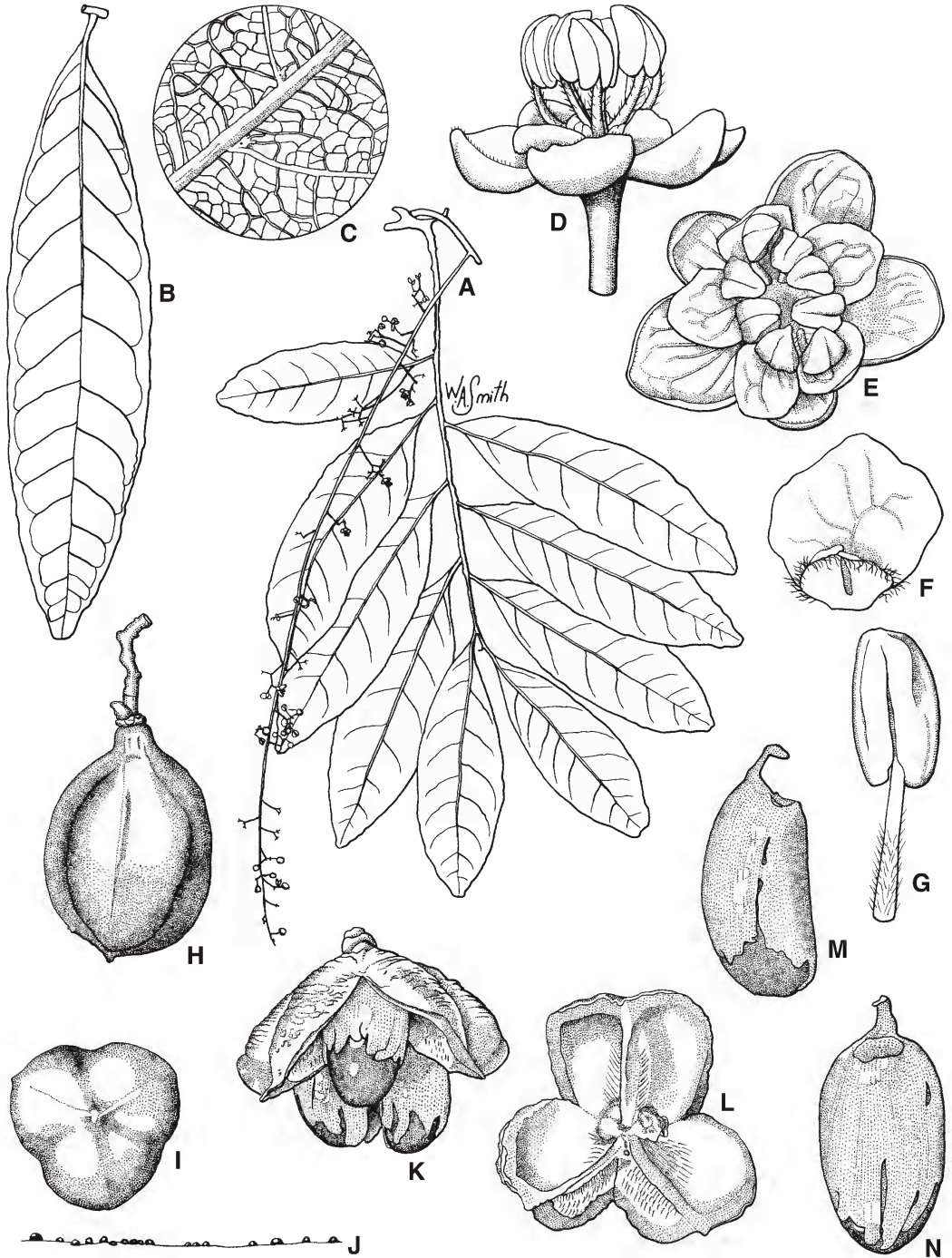
**Illustrations:** Hyland *et al.* (2003) as *C. dallachyi pro parte* [leaf x-ray image based on Gray 1037]; Cooper & Cooper (2004: 484).

Shrubs or small trees to 12 m high, often multistemmed, functionally monoecious. Indumentum (unless otherwise stated) of uncoloured simple trichomes, rarely comprising stellate trichomes. Branchlets terete, longitudinally lenticellate, brown-grey, new growth with short, sparse to dense indumentum of simple trichomes (sometimes stellately clustered), glabrescent; flowering twigs 3–4 mm diameter. Leaves 5–6 (–7) -jugate; petiole somewhat flattened and slightly winged, 50–75 mm long, 2.5–3 mm diameter, glabrous; rhachis somewhat flattened and slightly winged, 40–275 mm long, glabrous. Petiolules 7–12 mm long, often indistinct from the leaflet lamina base; pulvini grooved on top, 4.5–6 mm long, glabrous. Leaflets subopposite to strongly alternate, coriaceous, elliptic, oblanceolate or obovate, 42–185 × 15–56 mm, length-width index 2.3–5.3, glabrous; domatia in 1°/2° vein axils below, dome-shaped, ± ellipsoid, 0.2–0.4 mm long; base attenuate to cuneate, often unequal; apex obtuse, retuse, truncate, rarely acute; margins flat, entire; both sides glabrous and glossy. Leaflet lamina venation prominent; 1° venation comprising a midrib that is prominently raised below and visible but only slightly raised above; 2° venation comprising 11–14 lateral vein pairs per side of the midrib, 3–9 mm apart, prominently raised below, visible but not prominently raised above; 3° venation reticulate, prominently raised below, visible but not raised above; 4° venation reticulate, indistinct above and below; 5° venation very indistinct on both surfaces. Inflorescences pendulous, axillary or ramiflorous, occasionally branching from base, 70–300 mm long, panicles with long side branches to 250 mm long, with scattered to sparse, antrorse indumentum; bracts and

bracteoles triangular-ovate, 0.8–1.8 × 0.6–0.8 mm, with sparse to dense indumentum; flowers either functionally male or female, and with reduced sterile organs of the opposite sex. Male flowers 3–5 × 5–9 mm, cream; pedicels 3–4 × 0.5–0.8 mm, thicker towards top, with sparse, antrorse indumentum; sepals 5, 2-seriate, weakly imbricate, ciliolate, green, externally with scattered to sparse indumentum, internally glabrous, outer ones broadly-elliptic to ovate, concave, 3–4.5 × 2.5–3 mm, inner ones broadly-elliptic, 2.8–4 × 3–3.5 mm; petals 5, broadly flabellate, 1.8–3 × 1.8–2.5 mm, white, apex margin irregularly lobed, externally glabrous, internally with two scales 0.5–0.7 mm long that are densely pilose with antrorse indumentum; disc glabrous, 1.6–2 mm diameter. Stamens 8 (probably reduced to staminodes in female flowers), filaments 1.2–1.5 × 0.2–0.3 mm, with dense shaggy indumentum along entire length, anthers 1.7–2.2 × 1–1.3 mm, with an occasional trichome. Pistillodes *c.* 0.2 × 0.2 mm; ovary 3– (4)-locular, 0.8–0.9 mm long, with scattered long simple trichomes and scattered to sparse, short-papillate trichomes. Female flowers not seen. Fruit capsule with (1–) 3 (–4) well developed lobes, 22–35 × 15–30 mm; outside initially smooth, becoming slightly rugose when ripe, fawn-yellow, surface covered in scattered to sparse, minute papillate trichomes; inside densely villous, pale pink-brown; stipe 4–5 mm long. Seeds ellipsoid-obovoid, 15–22 × 8–12 mm, glossy tan-brown; hilum 2.8–3 mm wide, pseudohilum 3–6 mm wide; ariloid ribbed, red, covering around three-quarters to four-fifths of the seed. **Fig. 1.**

**Additional specimens examined: Queensland.** COOK DISTRICT: Tully Falls road, Charmillan L.A., [S.F. 251], just below start of Wabunga Wayemba walking track, 17°41'S, 145°31'E, Apr 2002, *Booth 3055* & *Jensen* (A, BRI, MEL); Gold Coast road, Cassowary Heights, near Ravenshoe, 17°38'S, 145°31'E, Nov 1995, *Cooper & Cooper WWC956* (BRI, QRS); *loc. cit.*, Oct 2004, *Cooper & Cooper WWC1900* (BRI, L, MEL, NSW); S.F.R. 251, Blunder L.A., 17°43'S, 145°31'E, Oct 1978, *Gray 1037* (BRI, QRS).

**Distribution and habitat:** *Cupaniopsis papillosa* is highly restricted in its occurrence and known only from a small area south-south-east of Ravenshoe with most collections from State Forest 251 (**Map 1**). Plants have been



**Fig. 1.** *Cupaniopsis papillosa*. A. stem segment with leaf and inflorescence  $\times 0.25$ . B. detail of venation in individual leaflet  $\times 0.5$ . C. domatia in axil of 1<sup>st</sup> and 2<sup>nd</sup> venation  $\times 30$ . D. side view of male flower  $\times 5$ . E. face view of male flower  $\times 5$ . F. internal view of petal showing two scales covered in indumentum and the irregular apex  $\times 10$ . G. stamen  $\times 10$ . H. side view of intact fruit capsule  $\times 1$ . I. face view of intact fruit capsule  $\times 1$ . J. papillose surface of fruit capsule. K. lateral view of dehiscent fruit capsule with seed in situ  $\times 1$ . L. face view of dehiscent, empty fruit capsule showing hairs  $\times 1$ . M. lateral view of seed covered in arilloid with pseudohilum at top  $\times 1.5$ . N. base view of seed showing pseudohilum at top  $\times 1.5$ . A–G, Cooper & Jensen WWC1838 (BRI); H–N, Cooper & Cooper WWC1900 (BRI). Del. W. Smith.

found in upland rainforest (complex notophyll vineforest) on red soils derived from basalt at altitudes between 840 and 1100 m.

**Notes:** This new species has a superficial resemblance to *Cupaniopsis dallachyi* (in the sense of the type collection) when only foliage is compared. Material of *Gray 1037* (here referred to *C. papillosa*) was used by both Reynolds (1985) and Adema (1991) in construction of their descriptions for the earlier described species, especially with respect to leaflet number. Critical examination of the foliage, fruit and seed of the two species reveals a number of differences (**Table 1**) and the markedly different fruit and seed are well

illustrated in Cooper & Cooper (2004). The two species are allopatric in the Wet Tropics bioregion with *C. dallachyi* occurring to the east and north of *C. papillosa* (**Map 1**).

*Cupaniopsis papillosa* is functionally monoecious, as are many Australian Sapindaceae (Gross 2005) and species of this genus in particular (Adema 1991). Individual trees may first produce inflorescences comprising solely male flowers (e.g. *Cooper & Jensen WWC1838*), but later the same tree will produce fruit (e.g. *Cooper & Cooper WWC1900*) (W. Cooper, pers. comm. Sept. 2005).

**Table 1. Comparison of characters for *Cupaniopsis dallachyi* and *C. papillosa***

Character State	<i>Cupaniopsis dallachyi</i>	<i>Cupaniopsis papillosa</i>
Number of leaflets per leaf	2–4-jugate	5–6 (–7)-jugate
2° lateral vein spacing in central part of leaflet	10–16 mm	3–9 mm
Capsule surface	glabrous	minutely papillose
Capsule colour	tan-brown	fawn-yellow
Arilloid colour	orange-yellow	red
Seed colour	glossy dark-brown	glossy tan-brown
Seed shape	flattened ellipsoid	ellipsoid-obovoid

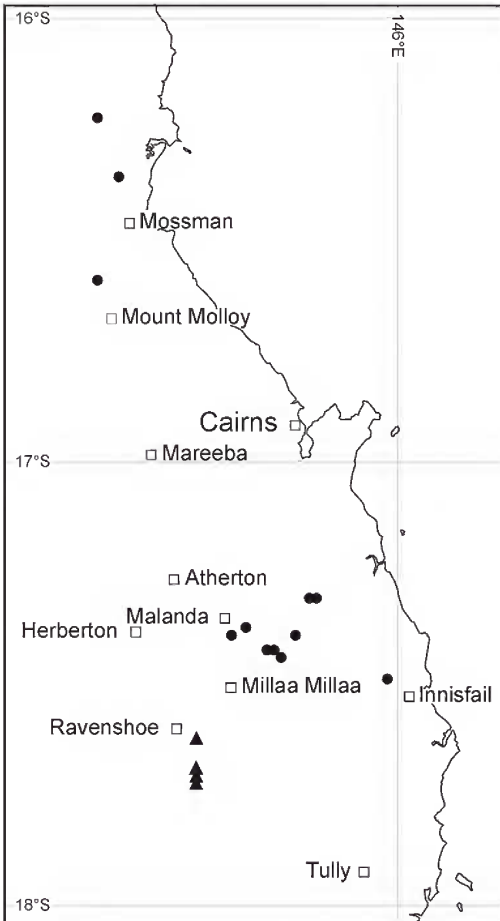
A revised key is presented here to the Australian species of *Cupaniopsis* based on that published by Forster (2002), but now including *C. papillosa*. The key requires flowering and/or fruiting material to be

successful. Collectors should also ensure that they procure young shoot tips in order that the character of stem apex indumentum is accurately determined.

**Key to the Australian species of *Cupaniopsis***

- 1 Leaflets mainly cuneate, widest at or near apex . . . . . 2  
 Leaflets elliptic, ovate, obovate or oblanceolate, widest well below apex . . . . . 3
- 2 Leaves 2–8(–10)-jugate, with pseudostipules. Leaflets spinose-dentate . . . . . **C. shirleyana** (F.M.Bailey) Domin  
 Leaves 1–2(–3)-jugate, without pseudostipules. Leaflets apically with 2–4 obtuse teeth, rarely entire . . . . . **C. wadsworthii** (F.Muell.) Radlk.
- 3 Young stem-apices glabrous . . . . . **C. cooperorum** P.I.Forst.  
 Young stem-apices pubescent. . . . . 4

- 4 Young stem-apices villous or tomentose (noticeably hairy with dense indumentum cover) . . . . . 5  
 Young stem-apices strigose (finely puberulent with scattered to sparse indumentum cover). . . . . 9
- 5 Sepals internally glabrous. Fruit capsules 15–20 × 22–28 mm, internally glabrous . . . . . **C. tomentella** (F.Muell. ex Benth.) S.T.Reynolds  
 Sepals internally with appressed hairs, rarely glabrous. Fruit capsules 9–20 × 13–18 mm, internally villous. . . . . 6
- 6 Margin of leaflets entire. Fruit pericarp 2.4 mm thick or more . . . . . **C. diploglottoides** Adema  
 Margin of leaflets ± dentate to crenate. Fruit pericarp 0.5–1.8 mm thick . . . . . 7
- 7 Teeth of leaflets hard. Inflorescences 1.5–6.5 cm long. Disc glabrous . . . . . **C. serrata** (F.Muell.) Radlk  
 Teeth of leaflets soft. Inflorescences (6.5–) 11–60 cm long. Disc with hairs in five tufts . . . . . 8
- 8 Petiole 3.5–9 cm long; leaves 4–10-jugate. Anthers hairy . . . . . **C. flagelliformis** (F.M.Bailey) Radlk.  
 Petiole 8–16 cm long; leaves (8–) 10–12-jugate. Anthers glabrous . . . . . **C. newmanii** S.T.Reynolds
- 9 Leaflets crenate-dentate. . . . . 10  
 Leaflets entire . . . . . 11
- 10 Trees over 10 m high. Leaflets with dome-shaped to pocket-like domatia below. Fruit capsules 18–22 × 18–20 mm; seeds 17–18 × *c.* 9 mm (SE Qld, NE NSW) . . . . . **C. baileyana** Radlk.  
 Shrubs or small trees to 12 m high. Leaflets with pustulate domatia below. Fruit capsules *c.* 15 × 13–15 mm; seeds 8–10 × 6.5–7 mm (north Qld) . . . . . **C. foveolata** (F.Muell.) Radlk.
- 11 Leaflets with domatia below. Disc glabrous or short hairy all over . . . . . 12  
 Leaflets without domatia below. Disc with hairs in 5 tufts. . . . . 14
- 12 Leaflets ovate to narrow-ovate . . . . . **C. dallachyi** S.T.Reynolds  
 Leaflets elliptic, oblanceolate, obovate . . . . . 13
- 13 Leaflets small (18–72 (–85) × 8–32 (–37) mm). Petals ± ovate, 1.3–1.8 mm long. Fruit capsules 11–12 mm long, orange; arilloid yellow, seed black (Cape York Peninsula) . . . . . **C. fleckeri** S.T.Reynolds  
 Leaflets large (42–185 × 15–56 mm). Petals ± flabellate, 1.8–3 mm long. Fruit capsules 22–35 mm long, fawn-yellow; arilloid red, seed tan-brown (Wet Tropics) . . . . . **C. papillosa** P.I.Forst.
- 14 2° veins in leaflets 2–5 mm apart . . . . . **C. parvifolia** (F.M.Bailey) L.A.S.Johnson  
 2° veins in leaflets 6–20 mm apart . . . . . 15
- 15 Small spreading tree to 15 m tall. Leaflet upper surface vernicose; 3° and 4° venation fine. Fruit capsules externally glabrous . . . . . **C. anacardioides** (A.Rich.) Radlk.  
 Tall straight trees to 25 m tall. Leaflet upper surface slightly shiny; 3° and 4° venation coarse. Fruit capsules externally puberulent . . . . . **C. simulatus** S.T.Reynolds



**Map 1.** Distribution of *Cupaniopsis dallachyi* ● and *C. papillosa* ▲ in north-east Queensland.

**Conservation status:** *Cupaniopsis papillosa* has a highly restricted area of distribution (less than 10 km<sup>2</sup>) and is known from three populations, two in State Forest 251. No obvious threats are known, although the degree of population fragmentation remains to be determined and survey work is required to determine the area of occupancy, number of individuals and whether other populations exist. Under IUCN (2001) conservation coding it should be regarded as Data Deficient at this stage.

**Etymology:** The specific epithet is derived from the Latin word *papillosus* (papillose, covered with papillae) and alludes to the highly reduced hairs on the ripe fruit exocarp that are papillate in appearance.

## Acknowledgements

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